

LISTING OF CLAIMS

1. (Currently amended) ~~An isolated nucleic acid having~~ A nucleotide primer or probe consisting essentially of a nucleotide sequence selected from the group consisting of:
 - (a) at least 10 consecutive nucleotides of residues 1 to 1591 or 2057 to 2343 of SEQ ID NO: 1;
 - (b) at least 12 consecutive nucleotides of residues 1 to 1591 or 2057 to 2343 of SEQ ID NO: 1;
 - (c) at least 14 consecutive nucleotides of residues 1 to 1591 or 2057 to 2343 of SEQ ID NO: 1;
 - (d) at least 16 consecutive nucleotides of residues 1 to 1591 or 2057 to 2343 of SEQ ID NO: 1;
 - (e) at least 18 consecutive nucleotides of residues 1 to 1591 or 2057 to 2343 of SEQ ID NO: 1; and
 - (f) a sequence complementary to any one of the sequences of (a)–(e).
2. (Canceled)
3. (Currently amended) An isolated nucleic acid ~~having~~ consisting essentially of a nucleotide sequence selected from the group consisting of:
 - (a) a sequence encoding a CatSper1 protein;
 - (b) ~~a sequence~~ a nucleotide primer or probe encoding at least a transmembrane domain of a CatSper1 protein;
 - (c) ~~a sequence~~ a nucleotide primer or probe encoding at least an extracellular loop of a CatSper1 protein;
 - (d) ~~a sequence encoding at least a pore region of a CatSper1 protein;~~
 - [[e]] (d) ~~a sequence~~ a nucleotide primer or probe encoding at least an epitope of a CatSper1 protein having high predicted antigenicity; and
 - [[f]] (e) a sequence complementary to any one of the sequences of (a)–[[e]](d);wherein the CatSper1 protein is a CatSper1 protein of SEQ ID NO: 2, an allelic variant of SEQ ID NO: 2, or a functional equivalent of SEQ ID NO: 2; and

wherein the nucleotide sequence of (b) through (e) does not include residues 1592 to 2056 of SEQ ID NO: 1.

4. (Currently amended) An isolated nucleic acid as in claim 3 selected from the group consisting of:

(a) SEQ ID NO: 1;

(b) a sequence encoding a polypeptide comprising residues 447-468, 481-502, or 516-533, ~~542-563, 583-604 or 649-670~~ of SEQ ID NO: 2;

(c) a sequence encoding a polypeptide comprising residues 469-480, ~~534-541, or 605-648~~ of SEQ ID NO: 2;

~~(d) a sequence encoding a polypeptide comprising residues 616-635 of SEQ ID NO: 2;~~

[[e]] (d) a sequence encoding a polypeptide comprising residues 2-34, 52-70, 108-130, 264-305, or 387-417, ~~or 606-614~~ of SEQ ID NO: 2;

[[f]] (e) a sequence complementary to any one of the sequences of (a)-[[e]](d).

5. (Currently amended) An isolated nucleic acid encoding a polypeptide having at least [[80]] 95% amino acid sequence identity with a polypeptide selected from the group consisting of:

(a) a CatSper1 protein;

(b) at least a transmembrane domain of a CatSper1 protein;

(c) at least an extracellular loop of a CatSper1 protein; and

(d) at least a pore region of a CatSper1 protein;

wherein the CatSper1 protein is a CatSper1 protein of SEQ ID NO: 2, an allelic variant of SEQ ID NO: 2, or a functional equivalent of SEQ ID NO: 2; and

wherein the nucleotide sequence of (b) through (d) does not have 100% sequence identity with a fragment of residues 1592 to 2056 of SEQ ID NO: 1.

6. (Currently amended) An isolated nucleic acid encoding a polypeptide, the polypeptide having at least [[80]] 95% amino acid sequence identity with a CatSper1 protein of SEQ ID NO: 2, an allelic variant of SEQ ID NO: 2, or a functional equivalent of SEQ ID NO: 2 and having CatSper1 activity in a cell capable of expressing CatSper1 activity.

7. (Canceled)

8. (Currently amended) ~~An isolated nucleic acid comprising~~ A nucleotide primer or probe consisting essentially of a nucleotide sequence that hybridizes to at least 10 consecutive nucleotides of residues 1 to 1591 or 2057 to 2343 of a nucleic acid of SEQ ID NO: 1 under conditions including a wash step of 0.1 x SSC at 65°C.

9. (Currently amended) ~~An isolated nucleic acid as in claim 8 wherein said nucleic acid encodes~~ encoding a polypeptide having CatSper1 activity and that hybridizes to at least 10 consecutive nucleotides of a nucleic acid of SEQ ID NO: 1 under conditions including a wash step of 0.1 x SSC at 65°C.

10. (Currently amended) A nucleic acid comprising:

(i) a nucleotide sequence encoding a polypeptide having CatSper1 activity, wherein said nucleic acid hybridizes to at least ~~a portion~~ 95% of a nucleic acid of SEQ ID NO: 1 under conditions including a wash step of 0.1 x SSC at 65°C; and

(ii) a heterologous regulatory region operably joined to said sequence such that said sequence is expressed.

11. (Currently amended) A nucleic acid comprising:

(i) a nucleotide sequence encoding a polypeptide having CatSper1 activity and having at least ~~[[80]]~~ 95 percent amino acid sequence identity with an amino acid sequence of SEQ ID NO: 2; and

(ii) a heterologous regulatory region operably joined to said sequence such that said sequence is expressed.

12. (Previously presented) A kit for detecting at least a portion of a CatSper1 nucleic acid comprising an isolated nucleic acid of any one of claims 1, 3-6 and 8-11 and a means for detecting said isolated nucleic acid.

13. (Original) A kit as in claim 12 wherein said means for detecting said isolated nucleic acid comprises a detectable label bound thereto.
14. (Original) A kit as in claim 12 wherein said means for detecting said isolated nucleic acid comprises a labeled secondary nucleic acid which specifically hybridizes to said isolated nucleic acid.
15. (Previously presented) A vector comprising an isolated nucleic acid of any one of claims 1, 3-6 and 8-11.
16. (Previously presented) A vector comprising a genetic construct capable of expressing a nucleic acid of any one of claims 3-6 and 8-11.
17. (Original) A vector as in claim 16 wherein said nucleic acid is operably joined to an exogenous regulatory region.
18. (Original) A vector as in claim 16 wherein said nucleic is operably joined to heterologous coding sequences to form a fusion vector.
19. (Previously presented) A vector comprising an isolated nucleic acid of any one of claims 3-6 and 8-11.
20. (Previously presented) A vector comprising an isolated nucleic acid of any one of claims 3-6 and 8-11 operably joined to a reporter gene.
21. (Previously presented) A cell transformed with a nucleic acid of any one of claims 3-6 and 8-11.
22. (Previously presented) A cell transformed with a genetic construct capable of expressing a nucleic acid of any one of claims 3-6 and 8-11.
23. (Original) A cell as in claim 22 wherein said nucleic is operably joined to heterologous coding sequences to encode a fusion protein.

24. (Original) A cell as in claim 22 wherein said cell is selected from the group consisting of bacterial cells, yeast cells, insect cells, nematode cells, amphibian cells, rodent cells, and human cells.

25. (Original) A cell as in claim 22 wherein said cell is selected from the group consisting of mammalian somatic cells, fetal cells, embryonic stem cells, zygotes, gametes, germ line cells and transgenic animal cells.

26-111. (Canceled)